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October 2016

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R E V O L U T I O N

» **Will bots liberate IT from mundane tasks,** *or will their development and upkeep only add to IT's workload?*

COMPUTERWORLD
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Apple Gambit May Pump Up The Market for Wearables

Facing an uncertain future for smartwatches and other wearables, the company tries to pique user interest in the Apple Watch 2 by emphasizing the new device's fitness features. **BY KEN MINGIS**

WHEN APPLE unveiled its new Apple Watch Series 2 on Sept. 9, it did so with an emphasis on fitness features — a pivot away from how it pitched the first Apple Watch in April 2015.

There's method to the madness: By paying attention to how early adopters actually use the device and catering to those needs, Apple hopes to boost sales among what one analyst called the "early majority."

The lessons Apple learns will be instructive for other smartwatch makers and are likely to shape how all types of wearable devices evolve.

"Fitness is the easiest selling point at the moment for wearables," said Carolina Milanesi, an analyst at Creative Strategies. "Fitness bands [like Fitbit] are still outselling smartwatches. Some of that is due to lower prices, but some of it is due to the fact that consumers are still not quite sure what smartwatches can do for them and if it's worth paying more."

Patrick Moorhead, an analyst at Moor Insights & Strategy, said if the new Apple watches — and the updated first version, now

called Apple Watch Series 1 — perform as well as demonstrated on stage, "sales will improve dramatically." He estimated the next wave of smartwatch owners could expand the size of the wearables market tenfold, creating a group he called the "early majority" instead of "early adopters."

> **People still don't know what to do with a smartwatch. Focusing on fitness is Apple's Trojan horse to get users to slowly start to use a smartwatch for other things**
>
> **JITESH UBRANI,** ANALYST, IDC

Apple is clearly focused on how its new smartwatch, which arrived in retail on Sept. 16, can be used as a fitness device. New features include built-in GPS for tracking hikes and distance runs (without taking an iPhone with you) and water-resistance to depths of 50 meters.

The Series 2 starts at $369, significantly higher than lot of fitness trackers. Fitbits, for instance, start at $60 and averages over $100 each, depending on the model. But Apple is betting that the Apple Watch's fitness features will attract people's attention and that curiosity about the device's other features will help them overcome their concerns about price.

"People still don't know what to do with a smartwatch," said IDC analyst Jitesh Ubrani. "Focusing on fitness is Apple's Trojan horse to get users to slowly start to use a smartwatch for other things, like notifications. Apple hopes they will later realize the value."

Apple's approach will be scrutinized by the entire smartwatch industry, which experienced a 32% drop in sales in the second quarter of 2016, according to IDC. Leading the decline was the Apple Watch, which saw a 55% drop in sales in the second quarter compared to a year earlier. In contrast, Samsung, Lenovo, LG and Garmin all reported sales gains.

Skeptics Remain

Because the future of wearables is uncertain, some analysts were less bullish about Apple's gambit than Moorhead was.

"It's good that Apple is trying to reposition the watch as a [stand-alone] solution rather than a peripheral device [to a smartphone], but at its current $369 price point, it may have limited market appeal," said Jack Gold, an analyst at J. Gold Associates. "I don't see this being a very high-volume market for Apple."

Gold said the price cut of the original Series 1 model to $269 would only boost sales if that device had more features like those in the Series 2. The

Series 1 watches will have the same upgraded system-in-a-package (SiP) dual-core processor and graphics processor as the Series 2, but nothing else to entice buyers except for the lower price.

Ubrani said the smartwatch market is a "very, very small market, and it will likely remain like that for a long time" despite a bit of growth. Unlike Moorhead, he's not optimistic that the market could grow rapidly in the next few years. "There certainly won't be anything like a [ten-fold] improvement," he said.

> ## I don't see this being a very high-volume market for Apple.
>
> **JACK GOLD,** ANALYST, J. GOLD ASSOCIATES

Fashion Forward

What seems to be driving much of the focus on the Apple Watch —and the entire smartwatch market in general—is a curiosity about how smartwatches and other wearables may evolve. Aside from the various features they offer—everything from games and messaging apps to mobile payment tools—fashion will likely play a role.

Apple's focus on the design of its watch's hardware and bands, and even the simplified interface in the Watch OS 3 operating system, will go a long way toward influencing the rest of the industry, Ubrani said. (For fashion-minded consumers with deep pockets, Apple launched a new $1,249 ceramic white Apple Watch, along with stylish new bands.)

"Fashion smartwatches are not a silly concept," Ubrani said. "People are interested in new designs and pay attention.
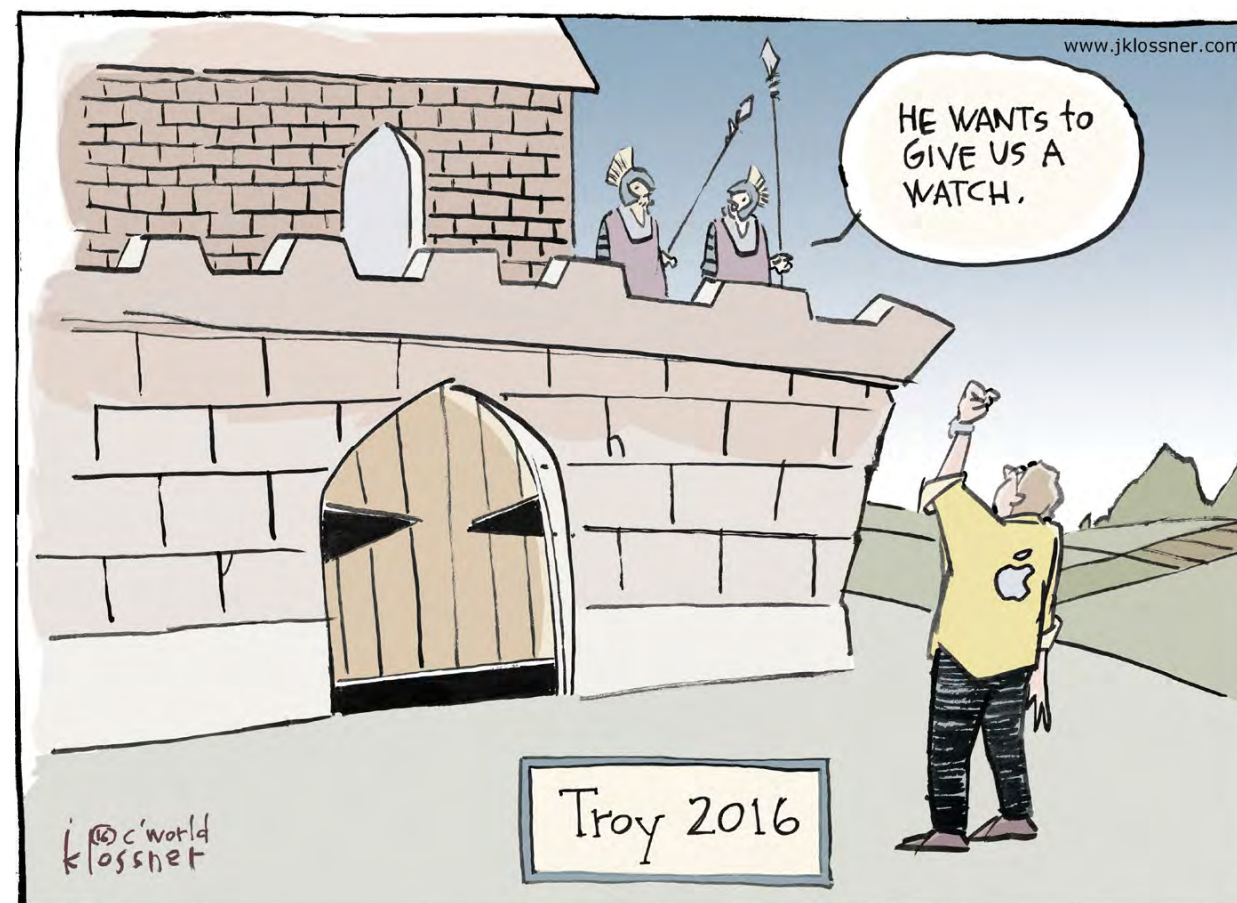
Many people, including women, weigh the design over the function."

Overall, he said, "Apple is doing a good job there, but there's still room for improvement." ◆

With reports from **MATT HAMBLEN.**

PRESTON GRALLA *is a* Computerworld *contributing editor and the author of more than 35 books, including* How the Internet Works *(Que, 2006).*

Microsoft's Tin Ear for Privacy

MICROSOFT keeps making news on the privacy front, and not in a good way.

Much has been made of the way Cortana in Windows 10 may invade your privacy by collecting data such as the words you speak and the keys you strike. Though that is disturbing to many people, Microsoft has responded by noting that Cortana needs to know that information in order to fulfill users' requests. That's true, but beside the point. The real issue, as my fellow columnist Steven J. Vaughan-Nichols points out, is that it's extremely difficult, if not impossible, to completely turn off Cortana.

Another potential privacy danger is more hidden than Cortana, buried deep in Windows 10 — what's called telemetry data. Telemetry gathers detailed information from every Windows PC, laptop and device about how Windows 10 is being used. So it tracks, for example, what software is installed on the system, what crashes occur, when and how those crashes occur, and more. And there's no way to turn that off, unless you use the enterprise edition of Windows 10 and your IT department essentially flips the "off" switch.

Microsoft claims there's no need for users to worry about the privacy implications of the telemetry data gathered by Windows 10 because the company aggregates and anonymizes the data and doesn't collect personal information such as names, email addresses and account IDs. In a blog post titled "Privacy and Windows 10," Terry Myerson, the Microsoft executive vice president in charge of the company's Windows and Devices Group, claims that the information is used to improve the reliability of Windows and applications that run on it.

Many Questions

But Microsoft has been called to task for the practice by privacy advocate the Electronic Frontier Foundation (EFF). A blog post by EFF staffer Amul Kalia criticizes the company not

just for collecting information for Cortana, but also for collecting telemetry data.

Kalia writes: "A significant issue is the telemetry data the company receives. While Microsoft insists that it aggregates and anonymizes this data, it hasn't explained just how it does so. Microsoft also won't say how long this data is retained, instead providing only general time frames. Worse yet, unless you're an enterprise user, no matter what, you have to share at least some of this telemetry data with Microsoft and there's no way to opt out of it."

Flawed Argument

Microsoft counters by claiming that if a PC didn't allow that kind of data to be collected, it might not work properly. But there's a problem with that argument: If that's the case, why does Microsoft allow te-

lemetry to be turned off in the enterprise edition of Windows 10? Don't businesses care about their PCs working properly?

This brouhaha is one more example of Microsoft's tin ear when it comes to privacy issues. For example, when the company released Windows 10 last year, it introduced a feature called Wi-Fi Sense that raised privacy flags because it allowed the operating system to share your Wi-Fi passwords with others. In fact, no automatic sharing occurred, and the power to turn it on or off was in users' hands. But sometimes perception is reality, and Microsoft got a great deal of unnecessary bad press as it stubbornly defended Wi-Fi Sense.

When the Windows 10 Anniversary Update was released this summer, Microsoft saw the light and killed the Wi-Fi Sense features that people worried

invaded their privacy. (Though its reason may have been that few people found the feature useful.) But at the same time, it also changed Windows 10 telemetry settings so that they couldn't be turned off. And that was a bad thing.

Real, Meaningful Opt-outs

This is an issue that has as much to do with perception and choice as it does with privacy. I think it's unlikely that the telemetry data Microsoft gathers is particularly dangerous and invasive. But if people are worried about Windows 10 gathering telemetry data, they should

be given the power to opt out.

The EFF recommends exactly that, saying that Microsoft should "offer real, meaningful opt-outs to the users who want them, preferably in a single unified screen." Microsoft should act on that recommendation, if only to be seen as the friend of privacy advocates, not their enemy. Offering "real, meaningful" telemetry opt-outs would garner the company a good deal of favorable publicity, something that's often rare for Microsoft. And people who worry about their privacy would feel more comfortable using the latest version of Windows. ◆

> **The telemetry issue has as much to do with perception and choice as it does with privacy. People should be given the power to opt out.**
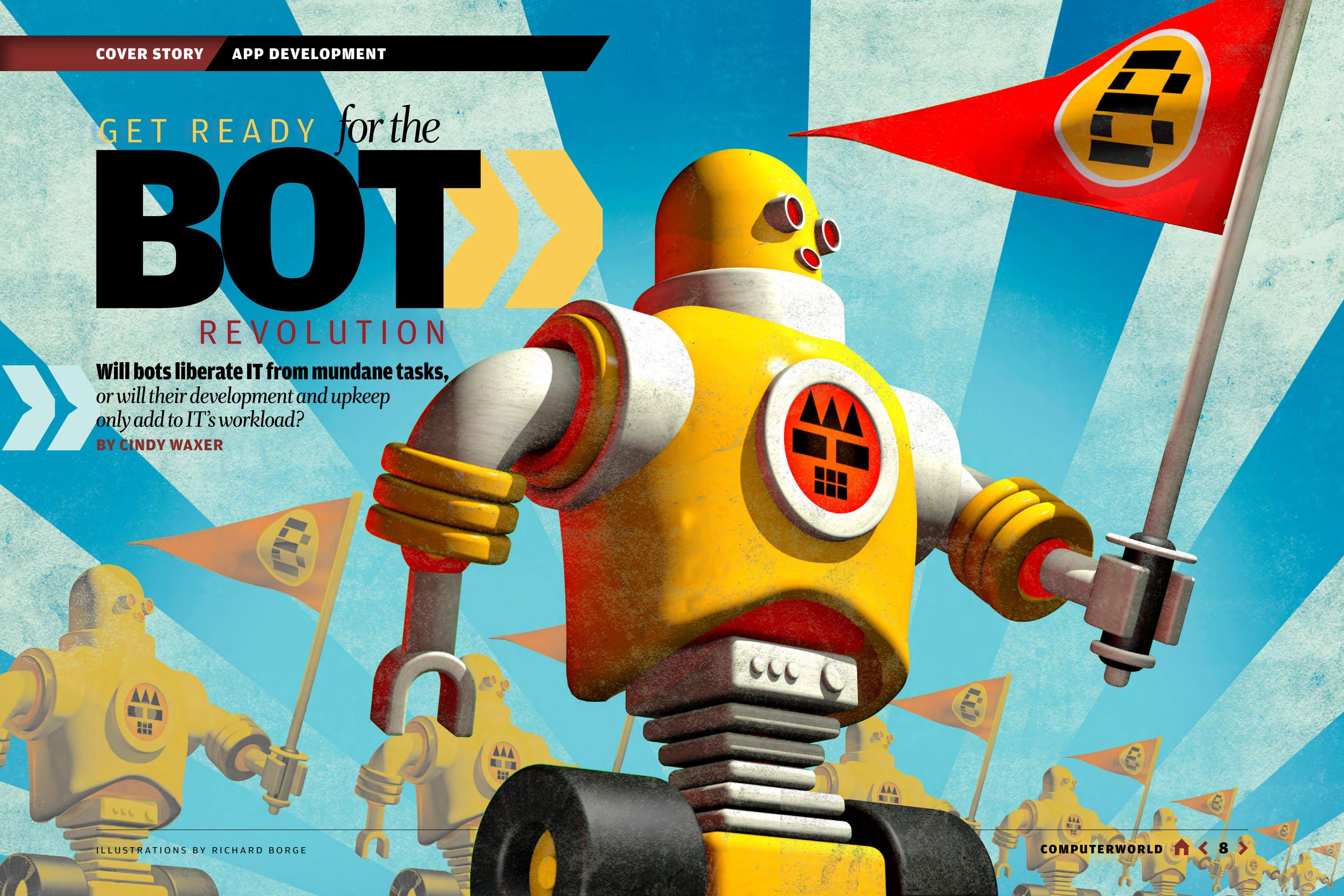
GET READY *for the*
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REVOLUTION

Will bots liberate IT from mundane tasks, *or will their development and upkeep only add to IT's workload?*
BY CINDY WAXER

FOR TODAY'S overworked, time-strapped IT employees, bots are more than simply apps that perform automated tasks, like delivering weather reports or taking pizza orders. Rather, they're a respite from endless help-desk calls, constant software updates and tedious server maintenance jobs.

"Eighty percent of IT's effort is focused on mundane, grunt work—ditch-digging to keep the lights on with barely 20% spent on innovation," says Frank Casale, founder of the Institute for Robotic Process Automation (IRPA). But bots promise to change all that, he says, by "taking on the bulk of the routine, dismal work that makes IT workers feel like human robots."

For example, AT&T is using bots to automate humdrum data-entry activities. And 1-800 Flowers has rolled out bots to help customers place online orders, while TV network CNN uses bots to deliver breaking news and personalized stories. By handling tasks that are either directly overseen by IT, or supported by IT resources, bots are fast becoming "magical for most IT departments," says Casale.

Bots Are Hot

Bot developers who need help pulling the proverbial rabbit out of the hat can turn to new technologies from Facebook, Microsoft and an emerging crop of bot-centric businesses.

In April, Facebook announced the launch of Bot Framework, a platform that allows developers to build chatbots for use on a variety of messaging platforms, including Facebook Messenger, Slack, Skype and WeChat. Since then, more than 11,000 bots have been created.

In March, Microsoft unveiled Microsoft Bot Framework—a set of tools for creating chatbots on multiple platforms, including Skype, Slack and Telegram. And an increasing number of startups, such as Pandorabots, Rebot.me, Imperson and Reply.ai, are releasing third-party platforms for people who want to build enterprise bots with a distinctly human touch.

In fact, according to a recent report published by Transparency Market Research, the global IT robotic automation market is expected to grow to $4.98 billion by 2020—a 60.5% leap from 2014.

It's easy to understand why: Thanks to powerful platforms, you can develop a bot in about one-fourth the time it takes to build a standard mobile app.
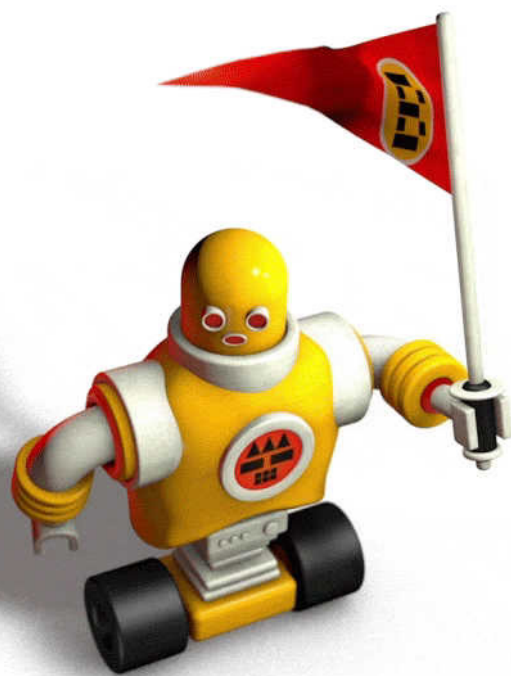
GET READY FOR THE BOT REVOLUTION

BY CINDY WAXER

And because bots don't rely on costly servers, they're approximately 50% cheaper to build and maintain, according to Casale.

But for all the optimism about bots liberating IT from mundane tasks, there's plenty of concern regarding the impact of bots on overall IT workloads.

To be sure, bots promise to free IT workers for more important tasks by automating activities such as ticket management, server load balancing and customer service. However, as an increasing number of companies embrace bots as an easier and cheaper alternative to web apps, many IT professionals are questioning whether bots will create extra work for already beleaguered IT teams.

There are plenty of labor-intensive byproducts of the bot revolution. The list includes honing bot development skills, identifying new security vulner-abilities and addressing bot design flaws.

While there's no definitive solution for challenges such as those, savvy IT leaders are determining how best to embrace bots and tackling the challenges that come with these much-hyped app alternatives.

A Prescription for Success

At HealthTap, the decision to build a bot was a no-brainer because the healthcare company has an ace internal IT team and a robust operating system. HealthTap offers a mobile app that lets consumers access a network of more than 100,000 doctors anytime, anywhere via secure video or text chat. Visitors can ask questions about everything from pregnancy to palpitations and receive personalized answers.

So when Facebook announced its bot platform for Messenger, HealthTap was eager to take advantage of the

> If you want to launch a smart bot that handles a complex use case, **THAT'S NOT A TRIVIAL EXERCISE**.
>
> **SEAN MEHRA,** HEAD OF PRODUCT, HEALTHTAP

social network's vast audience reach. The result is a Health-Tap chatbot that allows users to type a question into Messenger to receive free responses from doctors and view similar queries. HealthTap built the bot in "a few short weeks," says Sean Mehra, the company's head of product. But the quick turn-around belies the truth behind bot development, he adds, noting that building the bot that fast was a phenomenal feat.

"If you want to launch a smart bot that handles a complex use case, that's not a trivial exercise," warns Mehra. "The ability for us to take any human language, parse it, understand it, figure out what health concepts pertain to it, map it to a library of answers and send it to the appropriate specialist has nothing to do with a lack of complexity."

Instead, Mehra says Health-Tap's bot success is "really a testament to the fact that we have built a platform that's very developer-friendly."

That platform is Health Operating System (Hopes), a proprietary tool that serves as the operating system for Health-Tap's mobile app. By "reusing a lot of the infrastructure created when building the operating system," Mehra says, HealthTap

was able to design and deploy a full-fledged bot quickly while avoiding any "heavy lifting."

Another key competitive advantage for HealthTap is a workforce that would fit right in at a Silicon Valley startup. The collective expertise of the company's 100 employees encompasses product design, scalable back-end systems, linguistics, natural-language processing, machine learning and big data. Mehra says this combination of "both core technology expertise on the engineering side and a really strong understanding of user experience with a product and design focus" helped HealthTap get its bot off the ground.

Tapping Outside IT Talent

But not all companies have the same IT resources as Health-Tap. When it came time for Transcosmos America to design and develop a bot to provide

customers with fast answers to their most pressing questions, the master U.S. distributor for PC manufacturer VAIO turned to Reply.ai.

Reply.ai helps businesses build and manage chat bots over an array of messaging platforms. Tom Coshow, managing director for Transcosmos America, says that while there are a growing number of vendors offering bot development services, Reply.ai's "agent takeover" capability set it apart. This feature allows a human to take control of a conversation when a bot can no longer sufficiently address a customer's needs.

"For a high-end brand like VAIO, we never wanted to put our consumers in a situation where they would be trapped inside a bot that couldn't answer their question," says Coshow. "So agent takeover was super important to us. The idea that you could type 'agent' at

any time and get to a live person was a big deal."

To make that possible, Reply.ai needed to integrate its agent takeover feature into the contact system that runs throughout the VAIO call center. After devising a number

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of creative workarounds, Coshow says, Reply.ai eventually discovered a way to "drop messages" into the contact system so that bot conversations are automatically "routed to an agent inside the normal workflow of a call center."

That not only creates an

uninterrupted flow of communication between company and customer, but also enables continual improvement of the VAIO bot's functionality without requiring IT teams to monitor performance and flag glitches.

"The beauty of what we built with Reply.ai is that when a customer comes out of the bot, and drops down to the agent, the whole bot customer transcript comes with them," says Coshow. "So not only does the agent know what the consumer was experiencing in the bot, but he sees exactly where the bot failed."

Ease of use is another feature that drew Transcosmos to the Reply.ai platform. "Any power user can build a bot on Reply.ai," says Coshow, who worked as a programmer earlier in his career.

Price also played a key part in the vendor selection process: Coshow estimates that it cost $25,000 to design and develop the bot — a fraction of the cost of working with high-priced tech consultants.

"I've heard of agencies charging $150,000 to build a bot," he says. "To me, the way to build a bot is to build it with help from your customer service team. I

> When it comes to bots, **WHAT'S MOST CHALLENGING** for people is having a bot pass the Turing test.
>
> **SEAN MEHRA,** HEAD OF PRODUCT, HEALTHTAP

don't want to build bots with two programmers locked in an office. You want to build a bot in an organic way with your customers."

Virtual Marketing Director

Some businesses are even discovering bots that replace certain IT and marketing roles. Take Noli Yoga, for example.

The yoga apparel and active wear startup needed an easy and cost-effective way to run targeted ads on Facebook.

As a newly minted entrepreneur, Noli Yoga founder Slava Furman was already handling everything from design to fulfillment. And being an attorney by trade, he didn't know a thing about building a mobile presence or crunching data to figure out target audiences.

That is, until he discovered a marketing bot called Kit in the Shopify app store. For $50 per month, Kit sends Furman daily text messages that automatically notify him of profits, sug-

gest Facebook ad placements, encourage budget increases for previously successful campaigns and flag slow-moving products.

"It's an amazing application for someone who doesn't have the experience or time [to manage an online store]," says Furman. "It definitely saved me a ton of time and a ton of money, especially in the beginning." In fact, since launching the site in May 2015, Furman has tried out two different agencies to help manage the fledgling company's Facebook ads at a cost of nearly $4,000 per month for less-than-stellar sales results.

Conversely, Furman says, Kit was responsible for 80% to 90% of the $1.2 million in sales Noli Yoga garnered in its first year of operation

The Imitation Game

Whether your bot strategy involves pinning all your hopes on internal IT, tapping the IT

expertise of a third-party provider or creating a virtual IT manager, obstacles still abound for most businesses.

"When it comes to bots, what's most challenging for people is having a bot pass the Turing test," says HealthTap's

> **BOTS ARE GOING TO FAIL,** and when they fail, you need to be able to provide a live person. Otherwise, it'll be a terrible consumer experience.
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> **TOM COSHOW,** MANAGING DIRECTOR, TRANSCOSMOS AMERICA

Mehra, referring to a test that measures a machine's ability to imitate human behavior and intelligence. "How do you mimic a human conversation in a way that doesn't feel mechanical and robotic?" Mehra asks. "That's an area that the entire industry will focus on in

the coming years. And it's not a simple problem."

For there to be any improvement, Mehra says we'll need to see significant advances in our understanding and application of linguistics, natural-language processing and artificial intelligence.

In the meantime, Coshow of Transcosmos says the right content and tone of a text message can help compensate for a conversation's lack of human-like subtleties.

"You need to select verbiage that matches your audience," says Coshow. "If I'm trying to provide customer support to some executive in an airport lounge, and my bot is being flippant, that's a disastrous customer service experience," he says. "When you're representing your brand and providing customer support, it's important to err on the conservative side."

A saving grace is the presence of a living, breathing hu-

man being. Futuristic talk about machines replacing people notwithstanding, humans are still a critical part of the bot equation. "A big deal about bots is going to be whether or not you have access to [a human] agent," says Coshow. "Bots are going to fail, and when they fail, you need to be able to provide a live person. Otherwise, it'll be a terrible consumer experience."

But Are They Safe?

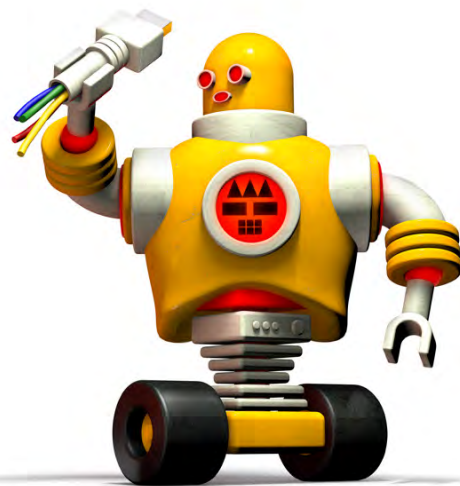One of the ways bots can fail is by opening up security holes.

A poorly designed bot can expose a great deal of information about a customer or a software program, says Yegor Bugayenko, a software architect who helped create Rultor, a chatbot that helps programmers build and compile their projects on Github and now boasts more than 400 users.

Before releasing a bot for public use, Bugayenko says,

RICHARD BORGE

IT teams need to carefully review code and ensure that sensitive information is protected. Data encryption and stringent access control policies are crucial, he says.

IT professionals who take the time to sharpen their bot design and development skills can improve their chances of avoiding security snafus. After all, says Bugayenko, building a bot "is not a typical skill set. It's not so easy for a regular programmer to design a chatbot."

Setting Standards and Boosting Bot Smarts

IT maintenance is another issue that bot developers need to consider. There are currently no industry standards governing bot design and development—a predicament that might make it challenging to integrate bots as an increasing number of them are deployed across disparate

messaging platforms. Nevertheless, Casale predicts that, "over time, we will see standards in place as it behooves the marketplace."

Others are banking on more innovative technologies, such as machine learning, to reduce IT maintenance tasks. That's HealthTap's approach. Mehra says that the company's bot becomes increasingly smarter with each and every question asked and answered.

"We have an army of doctors who are using the system and essentially training that machine," says Mehra. "So when doctors review and answer questions, they can see if a response was improperly tagged or rerouted, and they can then fix it." Ultimately, he says, this combination of "crowdsourcing and an algorithmic technology is much more skillful" than requiring IT staffers to constantly tweak and update a bot.

Looking Ahead

User experience, integration, security, maintenance—bot-related activities like those are all likely to put more work, not less, on the plates of IT teams. Development of bot-related skills, features such as agent takeover and the emergence of industry standards could ease

the burden. But one thing is certain: There's no way to automate bot success.

IT leaders must play an integral role in the process of properly designing, developing, deploying, testing and improving today's bots. Even Furman, who has had so much success with the Kit bot at Noli Yoga, admits that "once you get to a certain point [with a bot], it kind of tails off. There is a little bit of a limit or ceiling there."

While breaking that ceiling might create more work for IT in the short run, the hope is that turning mundane tasks over to bots will ultimately give time-strapped techies the freedom to pursue more pressing projects. ◆

WAXER is a Toronto-based freelance journalist. She has written articles for various publications and news sites, including The Economist, MIT Technology Review and CNNMoney.com.

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>
> **YEGOR BUGAYENKO,** SOFTWARE ARCHITECT, RULTOR

IT's IN-HOUSE Entrepreneurs

Visionary CIOs say the fastest way to meet the demands of digital transformation is to **empower IT employees**. Here's what it takes to build an entrepreneurial team.

BY MARY K. PRATT

THE TECH WORLD is famous for producing entrepreneurs who turn startups into corporate empires while radically changing the way people work, play and interact.

But what if that entrepreneurial spirit wasn't channeled into building new businesses? Could it, instead, be used to shake up existing organizations?

Absolutely, says David A. Bray, senior executive and CIO at the Federal Communications Commission.

Bray arrived at the FCC in August 2013 as the 10th CIO in an eight-year span. He stepped into the role as the federal government was undergoing sequestration. He inherited an IT infrastructure with 207 different on-premises systems for an organization with just under 2,000 employees, and those systems were a average of 10 years old. Maintenance costs were consuming more than 85% of the IT budget, and that figure was expected to climb.
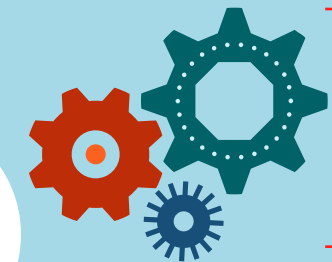
Tapping 'Intrapreneurs'

Maintaining the status quo wasn't an option, Bray says. So he devised a strategy to harness the entrepreneurial spirit of certain key workers — people he dubs "intrapreneurs" or "entrepreneurs on the inside" — and challenged them to take charge of solving problems and spearhead projects that could propel the agency forward.

Bray embedded these intrapreneurs into the 17 FCC bureaus and offices, where they could learn the top challenges within those units and find ways to use technology to solve them. He gave them autonomy, allowing them to pursue ideas without seeking permission as long as they stayed within a set budget. He says each division has an annual allotment of $150,000 to spend on such ideas.

> **They operate as entrepreneurs** to work with the bureaus and the offices to understand their challenges and how IT could best be baked in to help them in their missions.
>
> **DAVID A. BRAY,** SENIOR EXECUTIVE AND CIO, FEDERAL COMMUNICATIONS COMMISSION

"They operate as entrepreneurs to work with the bureaus and the offices to understand their challenges and how IT could best be baked in to help them in their missions," Bray says, explaining that he expects these intrapreneurs to go beyond simply gathering requirements. "I say [to them] that suc-

cess for you is getting stuff done."

In this age of digital transformation, visionary CIOs are looking for ways to innovate more quickly. To do that, some, like Bray, are tapping select staffers to lead the way, setting them in positions where they can identify areas for improvement as well as giving them more opportunities to brainstorm and more freedom to pursue their ideas.

"You might think it sounds crazy, but it gets results," Bray says. "They make things happen."

Bray cites a case in point: His in-house entrepreneurs worked with change agents (as Bray dubs some of the other workers in his organization) on how to upgrade the help desk. They outlined a project featuring software as a service that they completed for approximately $450,000 in about six months. Compare that to initial proposals for an on-premises appli-

> ## "These are people who come to managers and say, 'I'm interested in doing other things.'
> So it's important to have formal programs in place to allow people to express their entrepreneurial spirit even if they're not doing it on a day-to-day basis.
>
> **DARREN TEDESCO,**
> MANAGING PRINCIPAL OF TECHNOLOGY,
> COMMONWEALTH FINANCIAL NETWORK

cation with custom code that was projected to cost $3.2 million and take an estimated 12 months to compete.

Bray's use of the term *intrapreneur* isn't unique. However, neither *intrapreneur* nor *entrepreneur* is universally used to describe employees who exhibit entrepreneurial characteristics. Other executives use more conventional terms like *self-motivat-* *ed* or *go-getter* as they discuss the benefits of having such people on their teams. Whatever the terminology, though, CIOs who recognize the benefits of such traits are taking similar approaches to empowering entrepreneurial types.

Visionary Activities

Darren Tedesco, managing principal of technology at Commonwealth Financial Network, says he carves out time—typically a couple of days annually—for IT staffers to "work on anything—to work on problems that they think they can solve and that help our company or our clients." He also has a mentoring program where senior leaders advise workers who are engaged in what he calls "visionary activities."

"These are people who come to managers and say, 'I'm interested in doing other things.' So it's important to have formal programs in place to allow people to express their entrepreneurial spirit even if they're not doing it on a day-to-day basis," Tedesco says.

He also says he established a "decentralized system," because "if everything comes from the ivory tower, you can't have an entrepreneurial organization." He organized his IT department into a dozen or so teams that have a measure of freedom

to pursue their ideas on how to develop the best products and services they can in their designated areas.

And he says the company rewards workers who go above and beyond with incentives such as yearly bonuses and recognition awards.

> **Entrepreneurs inside an organization are risk-takers,** open to going against the grain, passionate, persistent, undeterred and comfortable with being uncomfortable.
>
> **GERRY LEWIS,** INTERIM SENIOR VICE PRESIDENT AND CIO, ASCENSION

That's only right, Tedesco says, considering the ROI these people have generated. As an example, he says, earlier this year a member of the team working with Commonwealth's customer relationship management (CRM) system decided

to build a tool to transport data sets that users found cumbersome to import into the system.

"It wasn't something he was asked to do. He did it on his own. He just had that drive. He just wanted to solve a problem," Tedesco says, adding that the worker had weekly and biweekly check-ins with his manager but otherwise had the creative freedom to develop a solution.

Granting entrepreneurial employees that kind of freedom is key to harnessing their energy, say Tedesco and others.

An Innovation Safety Net

But advocates stress that CIOs must have controls in place, too. They can't just set employees free to chase whatever visions they have, regardless of cost or how those visions might square with the organization's strategic goals. Management needs to channel the drive these people exhibit into innovations that

benefit the organization.

One way Tedesco does that is by using a risk spectrum that he devised to evaluate his teams' ideas. He tells workers to consider the worst-case scenario should a proposal fail. If failure would have no impact on the business, then they're OK to pursue their ideas on their own. If failure means catastrophe for the business, then they need to confer with senior management about their proposed plans before moving forward. Most projects will fall between those two extremes, of course, but Tedesco says his workers get the point.

"There's a lot you can do to foster an entrepreneurial spirit, but there are checks and balances you need to put in place so it's not a free-for-all," he says.

To make such intrapreneur programs work, CIOs say, you have to recognize which employees to target and understand how to manage them in their

entrepreneurial endeavors.

"Entrepreneurs inside an organization are risk-takers, open to going against the grain, passionate, persistent, undeterred and comfortable with being uncomfortable. They are change agents and, most importantly, they have tenacity to get things done, whatever obstacles may stand in their way," says Gerry Lewis, interim senior vice president and CIO at Ascension, and CEO and chief data officer for Ascension Information Services.

He says managers in his IT department informally seek "associates' ideas and extend them opportunities to share creative practices and approaches to operational and organizational issues and problems."

Leadership Awareness

Although IT has no formal program supporting entrepreneurship within its ranks, Lewis says he encourages "developing the leadership awareness skills necessary to recognize, manage and incentivize associate contributions, but in ways different from how we already recognize associates via our existing performance management program."

"Our CIOs recognize these skill sets and regularly tap into the mindset of these intrapreneurs," he says. "Doing so, however, requires the right talent management tools and processes to identify valuable attributes, as well as the leadership insight to readily identify these entrepreneurial traits and position these associates with projects that will move the needle within our highly standardized and structured environment."

Bray has a similar take, saying: "We wanted someone who could see a problem, analyze it and find a solution." He says

> **By pairing those two,** those who understand the mission and context and the person who came in to do new development, **that's where we hit a real sweet spot.**
>
> **DAVID A. BRAY,**
> SENIOR EXECUTIVE AND CIO, FCC

the intrapreneurs in his IT shop were FCC workers who in their previous roles demonstrated that they were good listeners and problem-solvers who were trying to create change. Bray says he recruited from within the IT department and other functional areas in the FCC.

Matching Entrepreneurs With Change Agents

After the chosen employees took on their new roles as intrapreneurs (that is, indeed, the actual job title), Bray paired them with individuals whom he positioned as change agents.

"By pairing those two, those who understand the mission and context and the person who came in to do new development, that's where we hit a real sweet spot," he says.

Moreover, he says he set specific expectations, letting intrapreneurs know that they should identify the top five issues for

the bureaus they serve and that they should be the first IT professional that bureau employees approach with issues and ideas.

Such reflections show that harnessing entrepreneurial workers does indeed require thought, effort and leadership. On the other hand, these are people who don't need any hand-holding.

Seeing Challenges as Opportunities

"These are people who, regardless of what they're doing, are looking and thinking, 'How can I go above and beyond? How can I go above the necessary requirements of the job or the situation or the project or the initiative and provide greater value and provide something that's new or that's different?'" says Joe Iannello, vice president and CIO at the Capital Metropolitan Transportation Authority (CMTA) in Texas. "That's

one aspect. Another is attitude. They look at every challenge as a potential opportunity."

Iannello says the CMTA, which is Austin's public transportation agency, has introduced a series of innovations in recent years and managers can easily spot

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> CAPITAL METROPOLITAN TRANSPORTATION AUTHORITY

entrepreneurial personalities.

Once the entrepreneurs are identified, managers are expected to support them so they can bring their ideas to fruition. Iannello says it's not about giving them more funding, per se. Rather, it's about giving them work that

keeps them interested and challenged and going down the paths they proposed. From there, their own drive can take over.

"It's providing them with opportunities that directly hook into that spirit, so they're more likely to be assigned to

the innovative or cutting-edge projects," Iannello says. "Then it becomes almost a self-propelled experience. It builds upon itself." ◆

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5 Ways *to* BETTER SURVEY IT Employees

Collaboration and survey tools abound, but actions speak louder than data.

BY STACY COLLETT

IT'S HARD TO BLAME employees for a little work apathy in the summer months when warm weather and vacations beckon. But a recent Gallup poll reveals that employee disengagement is pervasive year-round.

Nearly three-quarters (71%) of millennial workers say they are either not engaged or "actively disengaged" at work, meaning they may be unproductive or spreading their negativity to their co-workers, according to the August 2016 poll. The overall average for U.S. employee engagement — the extent to which employees are committed to their organization — sat at 32.6% in June and has hovered between 31% and 33% since 2014.

Here's where technology steps in. To keep employees' unhappiness from reaching a tipping point, companies are turning to more frequent surveys to gauge the mood

of their staffers, thanks to a slew of new survey and collaboration tools that make pulse-taking easier. Moreover, in an effort to keep people motivated, employers are also providing ongoing performance feedback to employees, especially their newest hires, who have grown up with tools that foster social collaboration and expect that capability in the workplace.

"If I can push out [a survey] to my employees on their mobile device and have them respond, it shows that I care about them," says Jeff Corbin, CEO of Apprise Mobile, a communication platform that brings surveys to employees. "The employee is more engaged, and the employer can react instantly to the feedback."

But even though constant opinion-sharing and instant digital gratification are now the norm, is it possible that frequent surveys and constant

feedback could burn people out, especially if the feedback doesn't appear to lead to any change? Will it further erode in-person dialogue between employees and management?

Lisa Rowan, analyst, IDC

"Measurement without action is pointless," says Lisa Rowan, an analyst at IDC. "What do you do with [survey data] and all this sentiment?" The survey app market is only about 18 months old, she adds, and the effectiveness of the apps is still unknown.

Many IT and engagement leaders have found success in employee surveys, especially when they're combined with other feedback tools. Here's a look at their experiences, along with tips for surveying employees for maximum results without turning them off.

1 Make it frequent and bite-size.

"Feedback, to be best, is in real time, continuous and bite-size — and therefore most actionable," says Andrew X. Wilson, CIO at global consulting and technology

> **If somebody impresses me, I can find them [on the app] and provide feedback.** They see it, their career counselor sees it, and it builds up as a body of feedback through the year.
>
> **ANDREW X. WILSON,** CIO, ACCENTURE

firm Accenture. "They need to know in real time how they're doing."

Accenture wants its employees' development curves to be as agile as the projects they work on, so the firm provides its 336,000 global staffers with regular feedback on their work through mobile apps and collaboration tools — part of a revamp of the firm's performance review program, completed in September 2015, that focuses on real-time, frequent and forward-looking coaching discussions.

Accenture has a mobile app called People that lets managers swipe through photos of employees and offer instant feedback to those who have just done something noteworthy.

"If somebody impresses me, I can find them [on the app] and provide feedback," Wilson says. "They see it, their career counselor sees it, and it builds up as a body of feedback through the

> **The lesson here is there are things that are taken for granted and overlooked,** yet they are table stakes of what associates are looking for.
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> **MIKE ROSELLO,** SENIOR VICE PRESIDENT AND CIO, ALLIANCE DATA

year." The app is particularly helpful because Accenture deploys resources on a day-by-day, sometimes hour-by-hour, basis as employees move between clients and projects, he adds. The potential for receiving feedback is much broader, anecdotal and more specific than in the past.

"I don't have to sit down and remember who I worked with

over the course of the year," Wilson says.

The firm also introduced a tool for measuring team engagement this year. Using the format of Gallup's Q12 Employee Engagement Survey, the tool allows teams to give leadership real-time feedback on how the team is doing. Both Accenture tools allow employees to give

feedback to anyone at any time, whether it's a team member, a peer or management.

"We can get real-time reaction from the team, and it speeds up the efficiency of teamwork," Wilson says.

2 Turn feedback into timely action.

Surveys often uncover important issues that employees don't want to talk about in person. At Alliance Data, an online employee survey revealed that 17% of workers viewed the company's training practices as unfavorable and 15% remained neutral on the subject.

"I see training as one of the largest unfavorable results [in the survey], yet in routine conversations with associates it's rarely ever brought up," says Mike Rosello, senior vice president and CIO.

Alliance Data, which also

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> JAMES FAIRWEATHER, SENIOR VICE PRESIDENT OF INNOVATION, PITNEY BOWES

deploys a seven-person employee engagement team each month to meet with and gather feedback from workers, followed up with staff on the training issue and discovered that the real problem was finding time for training, especially the courses that require travel. The feedback prompted the company to add more on-site training and make classes larger to accommodate more people.

"The lesson here is there are things that are taken for granted and overlooked, yet they are table stakes of what associates are looking for," Rosello says.

3 Use surveys for organizational change.

Pitney Bowes used collaboration tools and surveys and embraced feedback throughout its digital transformation, which began two years ago. Feedback channels gave employees a voice in the process and a visible career path.

"We first had to understand where employees were in terms of technical skills and training," says James Fairweather, senior vice president of innovation. He distributed the company's technology strategy to the

organization and solicited feedback using Confluence, a team collaboration tool that allows a more organized flow of ideas than traditional email. His team then held a series of small forums with employees and leaders to determine what skill sets needed to be developed within the organization.

Fairweather's innovation team then developed a unique, yearlong training program. Rather than give employees a set of tasks to complete, they had team leaders hold a series of monthly meetings covering one of 10 identified training areas.

"Our goal was moving them from one set of skills to the new set of skills — and to enhance their careers," Fairweather says. "We surveyed them at the end to ask how it helped to improve understanding of the company, and we got really phenomenal feedback. They felt like they

were connected to one company, that they were integrated into the process, and that the company had invested in them."

Fairweather also emphasizes the importance of face-to-face feedback in addition to automated surveys. "Face-to-face interaction develops an empathy that we have found to be invaluable — hearing how the words are said, as well as what is written," he says. "You need both of these to make good decisions."

4 Know your staff's survey threshold.

Many mobile survey developers say employers can use their apps to take the pulse of their staffs weekly or even daily. Corbin, of Apprise, has a more conservative view, suggesting that mobile surveys are most effective on a quarterly basis.

At Pitney Bowes, global em-

Jeff Corbin,
CEO, Apprise
Mobile

ployees receive more than a half-dozen surveys a year, but leaders are mindful of the burden and collaborate to limit the number of surveys.

There's no clear answer as to how much survey-taking is too much, but organizations that had an ongoing process of continual feedback report 90% engagement satisfaction, according to a study by employee engagement consulting firm Smith & Henderson. Some 63% of employees who took surveys more than once a year, but not continually, say they are satisfied, and 59% of employees who were surveyed once a year report being satisfied with their engagement at work.

Companies must guard against "surveying out" employees, the report concludes. If em-

ployers ask for feedback too often and don't have sufficient time between surveys to act on it, then the feedback is ineffective. A prepared online survey, for instance, usually takes about 10 weeks to administer and act upon, according to Smith & Henderson.

5 Give employees the power to act.

Emerging survey and collaboration tools have the potential to empower employees and give them a voice in the organization, yet very few employees feel more empowered today than they did 10 years ago, says Gary Hamel, author of *The Future of Management* and *What Matters Now*, and a faculty member at the London School of Business.

"Companies are overlaying

Gary Hamel,
author

[these technologies] over 19th century hierarchical management models" of top-down bureaucracy where workers have little decision-making power, Hamel says.

Collaboration tools have given employees access to more company knowledge than they ever had before, and layers of management are getting in the way of agile decision-making.

Companies like GE, W.L. Gore and Whole Foods are adopting self-management models that give employees the power to act on that knowledge.

"We have to rethink everything we do around a new set of principles of openness, transparency, meritocracy and experimentation," says Hamel. "Companies that are on that journey are going to win." ◆

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Security Manager's Journal

Trouble on the Network

No sophisticated SOC? You can still be pretty sure that you're detecting any potential security problems.

WE HAD A SCARE the other day with a critical cross-site scripting (XSS) attack that seemed to be entirely contained—source and destination—on our network. Tracking down and resolving the problem were fairly routine tasks, but it's worth noting how it's possible to spot potential security problems when you don't have a world-class security operations center (SOC) staffed with skilled analysts and equipped with large-screen monitors and all the bells and whistles.

When you work for a smaller organization, you don't have the luxury of a 24/7 SOC. We compensate by building automation into the monitoring of our logs and cherry-picking events that will generate email notifications. Other events get our attention when we can carve out time to monitor the threat logs generated by our advanced firewalls and the security logs produced by a multitude of other devices: web and database servers, load balancers, proxies, file integrity monitoring software, etc. We collect the logs in a centralized server, and a few filters help identify logs that meet certain criteria. I and a couple of analysts take turns monitoring the filtered logs. We don't get 24/7 coverage, but it's pretty close.

XSS Activity

One of the events that we have decided should generate an email alert is XSS activity. Now, on any given day, XSS attacks against our public-facing resources are a given. In fact, our public marketing websites and applications are regularly subjected to SQL injection attempts, Conficker, Shellshock and multitudes of other attacks, as well as standard port-scanning activity as hackers look for vulnerabilities.

But this particular XSS attack was unusual and worrisome. Its source was a PC on our internal network, and the destination was a server on our development network responsible for source code management. There was a good chance that the PC was compromised and attempting to attach to other resources on our internal network—or that a rogue employee might be trying to

hack our source code.

On the other hand, it could be a false positive — for example, a misconfigured application or script that appears to be an attack. That possibility had to be researched first, so we took a closer look at the network traffic and saw the following indicators, which (to me) are indicative of an XSS attack:

```
"...User=weblogic+<
script>alert(xss')</
script>&NQPassword=abc123456..."
```

I traced the IP address to a PC running Mac OS that was assigned to an engineer in our India office.

Normally, I would first launch a surreptitious investigation, monitoring traffic and conducting some background checks on the employee, but I wanted to act quickly. I contacted the engineer's manager, who assured me the engineer was a stellar employee, a critical resource on the team and a person of high integrity. Trusting that testimonial, I contacted the engineer via email to see what he could tell me about the suspicious traffic.

Bad Luck

Fortunately, my trust wasn't misplaced. His explanation made it clear that nothing as exciting as an internal attack was going on.

Some background: A few weeks ago, we launched our yearly security-awareness training, which includes general awareness training for all employees and specialized application security training for engineers involved in the development, testing or QA of our products. After completing the training module on XSS, the engineer wanted to see if what he had learned would work on a development server on the in-ternal network. And, bad luck, he chose the server hosting our source code repository. Bad judgment, perhaps, but at least the situation showed that our network monitoring is working.

In fact, I praised the engineer for wanting to test the security of applications that he is responsible for developing. After all, my philosophy is that security is everyone's responsibility, and when you don't have a huge security staff, security testing should be encouraged.

But I also explained that he needs to coordinate any testing with the security department so that we can provide some over-sight and will know to attribute any alerts to his announced activities.

In the end, everyone involved was relieved that the alert had arisen from a relatively benign event, but I also got a good night's sleep because being alerted in the first place means we can feel fairly confident about our ability to detect real problems. ◆

> **The source of the attack was a PC on our network. The destination was a server on our development network responsible for source code management.**

SHARKTANK

TRUE TALES OF IT LIFE AS TOLD TO SHARKY

Not Exactly the Priorities They Had in Mind

IT'S TIME TO REVIEW this IT shop's disaster recovery plans, and the topic of staffing comes up. "Management figured they'd just ship the important technical staff out of the area and put them up in hotels, and they'd work at the DR vendor's site," reports a longtime pilot fish who's at the meeting. "Possible disasters ranged from building issues to hurricanes, tornados, earthquakes and civil strife. Knowing most of the tech staff live

within a couple miles of the office, I asked about families in the case of the external disasters. Blank looks all around. I finally said, 'If there's a natural disaster significant enough to take out this building, what do you think will happen to Joe's house, less than a mile away? If his house is taken out, do you really think he'll leave his wife and young kids to fend for themselves in a shelter while he gets to hang out at a hotel and eat restaurant food?' They didn't like my point. They

HAL MAYFORTH ILLUSTRATION

> **They didn't like my point. They were sure that Joe — and all the others — would drop everything for the good of the company.**

were sure that Joe — and all the others — would drop everything for the good of the company."

Timing Is Everything

New tablets being set up for users aren't appearing in the asset inventory system, so this pilot fish is called in to help. "No matter how often the tech setting up the tablets ran the network discovery program, they were never found until after they were delivered to users," says fish. "Sure enough, when I tried it didn't work. Pinging from the discovery server

didn't get a response. In desperation, I asked if the firewall had been changed to allow response to a ping request. No, came the reply, the firewall was only adjusted when the tablet was handed to the user. I had to keep a straight face while explaining that network discovery depends on pings, so the firewall tweak needed to be done much earlier in the process."

The Perfect Day

Programmer pilot fish has built a custom manufacturing system

for a client, and kept it running for years. "About four years ago, I created a report that looked at completed jobs for a given date range to compare on-time versus late deliveries," says fish. "I didn't receive any additional requests for changes or support — until recently, when I was asked why there were errors appearing and no data on the report. After a quick review of the underlying queries, I realized I had unintentionally assumed that there would *always* be at least one job that shipped late. As long as

there was one overdue delivery, all of the data would appear on the report. If there were no overdue jobs, then the query would produce zero records. It took four years for my client to finally have a day in which they shipped 100% of their jobs on time in order to uncover this error in my query structure!" ◆

DON'T WAIT FOUR YEARS *to send Sharky your true tale of IT life at* sharky@ computerworld.com. *You'll get a stylish Shark shirt if I use it.*

PAUL GLEN *is the co-author of* The Geek Leader's Handbook *and a principal of Leading Geeks, an education and consulting firm devoted to clarifying the murky world of human emotion for people who gravitate toward concrete thinking. You can contact him at* info@leadinggeeks.com.

Retention, by Stages

I AM OFTEN ASKED, "What can I do to retain my most valuable IT employees?" And when I respond with, "What are you doing now?" I'm told about training, pay and bonuses, flextime, teamwork, flat organizations, independence, casual dress codes, health benefits, 401(k) matching plans, profit sharing and free food.

What's particularly interesting is that the basic menu is the same for everyone.

Two underlying assumptions seem to drive this. First, that the only way for employees to feel that they are being treated fairly is to have a uniform policy that applies equally to everyone. Second, that the same set of policies will elicit the same desirable response from everyone in an organization.

The first assumption seems pretty reasonable, but the second likely misses the mark. Different people want different things from their employers.

One way that organizational theorists look at issues of retention is by examining what they refer to as the employee's "psychological contract," which describes what people believe they can contribute to the organization and what inducements they expect in return.

Studies have shown that when employees (and potential employees) contribute in ways that they like and are compensated as they prefer to be, they are more likely to stay with (or take a job at) an organization than they would be otherwise.

But these studies have also shown that how employees

want to contribute and what they want to receive changes as they pass through various stages of their careers. In other words, as people age, their expectations change. So to retain employees, you may need to accommodate the evolution of their preferences rather than assume that everyone will respond favorably to the same package of compensation and benefits.

Four Stages

There are many ways of looking at employment trajectories and determining what the meaningful stages of a career are, but a model that I find instructive includes the following four stages: the exploration stage, the establishment stage, the maintenance stage and the disengagement stage.

Let's take a look at each of those stages.

■ **Exploration:** People in the exploration stage see themselves as figuring out who they are and what they might become. They want to be nurtured and mentored, to explore and contribute in specifically directed ways. Independence and the potential isolation of flextime may be threatening rather than appealing.

People who are just getting on their feet financially and professionally are likely to respond to things such as pay, training, job rotations and teamwork.

■ **Establishment:** In the establishment stage, people see themselves as proficient contributors and feel that their organizations expect them to be go-getters.

While apprentices who are exploring their career possibilities may feel more secure with close supervision, established

professionals want independence and feel that their organizations should offer them opportunities to take on new and challenging work; they want to get promoted and fulfill their promise. They are most likely to respond to things such as flextime, empowerment in decision-making, opportunities for promotions and merit-based bonus pay.

■ **Maintenance:** People in the maintenance stage likely feel that they have plateaued in their careers and that they should be able to stay at the

> **You may need to accommodate the evolution of employees' preferences rather than assume that everyone will respond favorably to the same package of compensation and benefits.**

level they have achieved without being expected to continue to grow or take on new roles.

At this stage of life, many people start re-evaluating their priorities and may begin putting less emphasis on career and work without disengaging completely. They want to be kept in the loop and respected, but they also want to have more flexibility to attend to other priorities. People in this group are likely to appreciate flextime, health insurance, retirement benefits and opportunities to share their wisdom with up-and-coming colleagues.

■ **Disengagement:** Finally, when people reach the disengagement stage of their careers, they are approaching retirement and feel that their organizations should expect them to slow their work pace.

Instead of focusing on their careers, they turn their atten-tion to planning the next stage of their lives, whether it may be a new work endeavor or full retirement. They also may begin to feel that they are less competent than they had been at their peak, that they process information more slowly or that they have lost touch with new technologies and methods.

They want the freedom to choose how much they contribute and when their waning engagement will end.

At this stage, people appreciate flexibility and respect and may be interested in transitioning to a part-time consulting role that allows them to stay engaged but on a project basis.

A Role for Managers

The challenge for organizations that want to retain employees at all stages of their careers is to develop flexible policies that reflect the fact that peoples' expectations and contributions will evolve over the course of their lives.

And those policies should give managers the leeway to adjust to their employees' changing needs, capabilities and expectations. Whether people feel that their duties, compensation and benefits are reasonably adapting to their drives and desires is really up to their direct managers.

If managers understand how people change over their careers, they can create an environment that is conducive to long-term retention. ◆

> **Managers need to have the leeway to adjust to their employees' changing needs, capabilities and expectations.**